Over view of the Gorton's waste water treatment operation

all drains in the plant run to the Primary pits Located in the Mung Room. The two drains located next to each Fryer (8 drains total) empty in to the oil/water separator where the oil is collected and sent to the waste cooking oil tank. The water from the oil/water separator goes to the Primary Pit.
From the Primary Pits the water is sent to the Roto-Strainers where the solids (fish, strings and crumbs) are removed.
The water free of solids is then sent to the Secondary Pit where it is pumped to the 85,000 gallon holding tank and stored

When ready to process the Waste Water The suction and discharge valves on the feed pump from the 85K tank are opened and pump started from control panel. Water is pumped in to the chemical treatment process. Coagulant is added in first mixing tank, to destabilize emulsifiers, followed by pH neutralization in the second mixing station. The flocculent is added in the third mixing section to create a larger particle size before entering the DAF clarifier for water/solids separation.

Solids are skimmed off the top of the water and sent to the sludge tank to dewatered using lime and pumped in to the filter press, lime cakes are transported to area farms to use as fertilizer.
Cleaned water is sent to the flume where the flow and final pH is recorded on the panel view.

Aries Chemical Incorporated

P.O. Box 519, 6604 Depot Street, Beaver Falls, NY 13305
TEL: 315-346-1489 FAX: 315-346-1658
E-mail: aries@arieschem.com

June 24, 2009

Process and Controls Description for Gorton's Inc. Effluent DAF Treatment System

Refer to the PFD-09-010-258* illustrating the process flows.

Existing Processes to Remain:

Process and cleaning wastewater from operations enter a common sump located in the Wastewater Treatment Area by gravity flow. Submersible pumps in the sump, activated by float switches, transfer water to duplex Rotary Screens which then discharge into one Vibrating Screen for solids removal. Screened solids discharge into a hopper situated below the screens, while filtered effluent gravity flows to a second sump located below the discharge outlet of the Screens.

Screened water is then pumped to an 85,000-gallon equalization tank using a centrifugal pump, which is activated by float switches in the sump.
Water in the equalization tank is aerated for complete mixture, and prevention of anaerobic odors.

Processes to be Upgraded

EQ tank & DAF Feed Pumping:

- The operator shall enable the treatment process at the PLC operator interface. When water is above 5 K gallons in the EQ tank the PLC will initiate pumping from the Equalization Tank to the treatment system. When the level drops to 1.3 K gallons the pumping will stop.
- The new duplex centrifugal pumping skid with two Goulds Pumps will replace the existing progressive cavity pumps. One pneumatically actuated valve on the pump discharge piping shall be opened and closed in order to prevent siphoning when the pumps are off.
- Note we are attaching at end of this document a description of a typical EQ tank level control that may not be appropriate for Gorton's. We understand Gorton's goal is to start up each morning and to pump EQ tank down with a low level desirable to reduce odor generation due to biological activity.

DAF Chemical Treatment Process & Controls:

Overview:

The chemical physical treatment process requires the chemical conditioning of effluent in reaction tanks. Coagulation chemistry is added in the first section of the mixing tank, to destabilize emulsifiers, followed by pH neutralization in the second mix section. The flocculant is added to the third mixing section to create a larger particle size before entering the Dissolved Air Flotation (DAF) chamber for the water/solids separation process.

A Signet Magmeter (model # 3-2551-P042) is located in piping between the EQ tank and the chemical mixing tanks. Flow rate to the treatment system will be controlled manually by adjusting the setting on the new VFD's (by Gorton's for speed control of the Gould's centrifugal pumps). An output signal from the PLC will control the speed of both the coagulant and flocculant feed pumps proportionally to the flow rate of the effluent. Strokes on the chemical feed pumps may be changed manually for optimal chemical conditioning. The neutralization tank, where acid and caustic is fed, is controlled automatically via one LMI Liquitron DP 5000 pH controller. Discharge from the flocculation tank gravity flows to the Aries DAF-70 Clarifier System.

Chemical Treatment Mixing Tanks:

- Coagulation mixer energizes with start up of feed pumping
- pH neutralization mixer energizes with start up of feed pumping
- Flocculation mixer energizes with start up of feed pumping. (Existing floc mixer with speed control.)
- When the feed pump de-energizes all three above mixers shall have a 10 minute delay off prior to de-energizing
- Acid and Caustic Pumps will also have the same 10 minute delay off prior to de-energizing

Chemical Feed Control Descriptions:

- Signet output to PLC for flow rate indication. Both Coagulant and Polymer pumps are LMI 9 series pumps with microprocessors. Configuration of flow proportional feeding shall be 0 gpm is 4 ma output and 150 gpm is 20ma to chemical pumps.

- PLC 115V @ 5amp to polymer feeder for water flow control & LMI power. On/off function (VFD signal via PLC will control metering pump on polymer feeder).
- One sodium hydroxide (caustic) feed pump and one sulfuric acid pump shall be controlled from a new LMI DP5000 controller (feed to PLC for data recording only). Control output to the two LMI pumps in service, 4ma = 0 pH and 20ma = 14. Aries will set up the LMI pump microprocessor to achieve desired control ranges.
- pH alarms at pH $\geq$ 8.5 and $\leq$ 6.0 both local and at PLC (different set points) utilizing dry contacts. Stop treatment flow if alarm condition not resolved within 20 minutes of alarm.

DAF Clarifier Controls:

- The sludge removal flight drive shall cycle on / off when there is flow through the system. The fixed speed flight drive shall be controlled with PLC program timers which are adjustable by the operator. Normal operation cycling mode: the drive shall be off for 10 minutes followed by an on cycle of 2 minutes. (timer ranges shall be 0 to 20 minutes)
- When feed pump is de-energized the DAF sludge removal flight drive shall have a 20 minute delay off prior to de-energizing.
- The DAF recycle system shall remain on 24/7 to maintain positive D.O. in the DAF and to keep sludge floating.
- DAF Sludge pump: The sludge collection section of the DAF shall have two tuning fork level switches and one water spray nozzle with one 115V solenoid valve. One level switch is for high level alarming and the other signals PLC to start sludge pumping cycle. The cycle shall energize one 115V solenoid valve for air supply to the sludge transfer pump. Energize the sludge pump for X seconds to lower the liquid level. PLC based adjustable timer 0-180 seconds. When the pump is energized also energize the water supply solenoid valve to clean off the tuning fork as the sludge pumps down. De-energize water and air solenoids at end of pump down cycle.
- When the DAF feed pump de-energizes the sludge pumping cycle shall have a 20 minute delay off prior to de-energizing
- Alarm at high sludge holding tank level. Also de-energize the DAF sludge pump cycle when high alarm.

Clarified water from the new DAF is discharged to the city via an existing Partial Flume for flow measurement. Continue to use existing pH monitoring system on the effluent. These readings are recorded in an existing chart recorder.

Sludge from the DAF is stored in an existing sludge holding tank.

At the end of a run, the operator will initiate the shutdown of the system at the PLC.
Typical EQ tank level control:

- The PLC program goal is to maintain the EQ level at 50%. When EQ tank level increases to 65% the DAF feed pump drive shall be ramped up via PLC program to maximum pump output of 250 gpm. As the EQ tank level decreases the controls shall decrease pumping rate to the DAF clarifier. As tank level decreases to ~ 35% the pumping rate to the DAF clarifier shall decrease to a minimum flow rate of ~ 50 gpm; pumps to be de-energized at low level set point of 25 %; pump on delay until level increases to 35% .